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ABSTRACT

This paper discusses the results of a study that compared two different course delivery methods. One of these used the Internet exclusively for module delivery while the other used a traditional campus setting. The two delivery methods were compared in order to determine if the Internet method was as good as the traditional approach. Results and suggestions for further study are described and some of the concerns identified are discussed. The module, which prepares students to take and pass an industry-recognized certification test, is currently being offered at the Community College of Southern Nevada. (Contains 14 references.) (Author)

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Computer-Based Distance Education for Vocational Use in Southern Nevada

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Abstract: This paper discusses the results of a study that compared two different course delivery methods. One of these used the Internet exclusively for module delivery while the other used a traditional campus setting. The two delivery methods were compared in order to determine if the Internet method was as good as the traditional approach. Results and suggestions for further study are described and some of the concerns identified are discussed. The module, which prepares students to take and pass an industry-recognised certification test, is currently being offered at the Community College of Southern Nevada.

Introduction

The Community College of Southern Nevada (CCSN) is responsible for delivering educational opportunities to a 45,000 square mile area in Southern Nevada. Enrolment at CCSN was approximately 40,000 students for the Autumn semester 2001 (September through December 2001). In order to meet the needs of so many students, CCSN has built six major and over a dozen outreach campuses. Despite this, many students, are still not able to take classes due to working schedules or because they reside at a significant distance from one of the campuses.

A continuing option for students who are unable to attend normal classroom instruction has always been distance education (DE). The increased availability and power of computers has created distance education opportunities that were not available years ago. However, the use of these is often sporadic, if they are used at all due to many factors including the cost of entry for both the institution (Matthews, 1999; Chambers, 1999; Barley, 1999) and for students (Matthews, 1999; Barley, 1999; Blumenstyk and McCollum, 1999). Many of the distance education modules at CCSN are delivered in a manner that requires students and instructors to meet at specific times for discussion, interaction and presentation. These modules offer students the opportunity to study in ways that are independent of place and time; indeed time and place flexibility are the two greatest advantages of distance education (Shave, 1998; Fender, 1999; Alexander, 1999). This is an attractive proposition for students with unusual or irregular work schedules or other time conflicts. This is especially the case for many people in the Las Vegas area due to the twenty-four hour nature of the entertainment industry.

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An additional constraint is the lack of experience and knowledge that instructors may have (Shave, 1998; Mudge, 1999; Twigg, 2001). Technology improvements alone do not offer most instructors the ability to offer distance education modules unless they are familiar and comfortable with the technology (Shave, 1999; Alexander, 1999; Matthews, 1999; Carnevale, 1999; Trinkle, 1999; Grill, 1999; Mudge, 1999). In addition, instructors must have the time and patience to learn how to use the technology. This can include expanding the frame of reference an instructor has from classroom-based instruction to instruction that is independent of place and time. Many instructors find this difficult. The steep learning curve experienced by instructors can be partially alleviated by a good computer support department at the college or university. However, the use of outside developers or content providers can affect a faculty member's control over his or her intellectual property.

Delivery that is independent of time requires the creation of online courses that can be accessed at any time and place, as long as Internet access is available. The module selected for delivery using the two methods described above was Computer and Information Technology (CIT) 106B. This module is a preparatory course for students who are preparing to take the Computing Technology Industry Association's (CompTIA) A+ Core certification test. This test is one of two tests required to become an A+ Certified PC Technician. Both delivery methods used the same textbook and tests.

In order for the Internet module to be as close as possible to the actual on-campus presentation, streaming audio and video were used to transmit the classroom lectures over the Internet (Beckstrand, Barker and van Schaik, 2001). Streaming does not require files to be downloaded before use. The use of streaming technology does not require specific class meeting times. Support, independent of time and place, was offered using email, voice mail, conventional mail, and office visits. All tests and questionnaires were delivered through computers using WebCT.

System overview

Any module that is delivered through distance education has three pre-requisites. First, the learning material that is covered needs to be disseminated. Second, communication between the instructor and student for questions and other feedback needs to be set up. Finally, learning must be evaluated and assessed. CCSN adopted a Web development tool set called WebCT. WebCT provides Internet-based tools for testing. While there is a learning curve associated with using WebCT, the curve is similar to that experienced when learning to use a new word processing program instead of a programming language. Once the tests are in place, students can receive immediate feedback after a test has been submitted for grading.

A Web site was developed to provide communication between the instructor and students. The Web site could be used to post messages of concern for all students as well as contain an email link so that students could send the instructor an email during the delivery of the module. Additional information could be added to the Web site if needed. Students' learning was evaluated and assessed through four tests administered on demand through WebCT. The first three tests were not comprehensive. The fourth test was comprehensive with questions covering all of the learning material presented. The Web site (http://itcert.ccsn.net) contained module syllabi, course information, textbook listings, and certification testing information.

Evaluation

An evaluation of the Internet delivery of the module, compared to the on-campus delivery, was conducted. This section describes the analysis plan and the results obtained.

The Computer Literacy Questionnaire (CLQ) (Murphy, Coover, and Owen, 1989) was administered to investigate any differences between the groups and as a possible predictor of students' performance. The first four questions on the CLQ collected demographic information. The thirty-seven literacy questions of the CLQ assessed self-perceived computer literacy. The scoring of the questionnaire was based on a five-point scale. Lower scores indicate less familiarity with computers while higher scores indicate more experience.

Analysis plan

The analysis of the study results consisted of four parts. The first part sought to discover if there were any differences between the Internet modules offered during the Summer time-frame and the module offered during the Autumn time-frame. Any major differences in the modules would prevent the combination of the groups into a single unit for comparison with students enrolled in the on-campus module. The second part of the analysis checked for any initial differences between students on the Internet module and students on the on-campus module that might have affected the outcomes and conclusions. The third part of the analysis involved the actual comparison of the on-campus module and the Internet modules. The results were expected to support the hypothesis of no (statistically significant) differences between the module outcomes. This would indicate that if an online module was designed correctly, students should be able to achieve the same results taking the online module as those taking the on-campus module. Finally, regression analysis was conducted in order to uncover factors that explain students' performance.

Data analysis was performed using SPSS for Windows (version 8). Students' names were not recorded in the data files. Students who registered and paid for the module were monitored to measure attrition. A total of 91 students were registered for the three Internet deliveries. Comparisons between the different presentation methods included age, pre-test, other tests, questionnaires, attrition, and final grade.

Results

All students responding on the CLQ indicated that they owned and used a personal computer.

Students enrolled on the Summer Internet delivery and Autumn Internet delivery did not have any statistically significant differences in the areas evaluated that precluded them from being combined as one unit. More Summer students registered for the Internet module because it was the only offering of the module and they did not want to wait until Autumn. Overall motivation concerning the modules was very similar between the two student groups. Since the results indicated that the two groups were similar, they were treated as one group in comparisons with the traditional module presented in the Autumn.

The analysis of the pre-test scores indicated that both groups were starting at an equivalent knowledge level. It was observed that the Internet module was the first non-traditional module for many of the enrolled students. However, as might be expected, most students following the on-campus delivery had previously taken other on-campus modules. Each of the tests administered during the module delivery was compared for differences. Questionnaire responses were also compared for changes during the delivery time frame. It was found that students registered for the delivery method they desired.

A number of different measurements were used to determine if the research hypothesis identified above was supported. Questionnaire One measured students' attitudes concerning motivation, delivery method motivation, and collected some demographic information. Questionnaires Two and Three measured students' attitudes concerning motivation, delivery method motivation and module delivery evaluation. Students' attitudes remained consistent during the module delivery with little difference between the two groups. A 2 x 4 mixed measures ANOVA showed there were no differences in test performance between the two delivery methods over time; the pattern of differences between the scores on the four tests was the same for both delivery methods. The test results thus supported the hypothesis stated above.

Regression analysis showed that students' test performance on test 1 was not related to their performance on the pre-test. Test performance on test 2 was significantly related to performance on the pre-test and test 1 combined, where performance on test 1 was a significant predictor. On test 3, performance was significantly related to performance on all previous tests combined, and performance on test 2 was a significant predictor. Test performance on the final test was significantly related to performance on all previous tests combined, with performance on test 3 and the pre-test being significant predictors.

Overall, the results indicated that students in the two delivery types were more similar than dissimilar. This conclusion was supported by the results of the first three steps of the data analysis. Even the attrition rate

between the two delivery methods was not significantly different. Detailed results will be presented at the conference.

Lessons Learned and Emerging Guidelines

The study results support the stated hypothesis. The Internet module was comparable to the on-campus module in helping students attain results. The students in the groups were very similar in all areas of comparison, in spite of the lack of random assignment to the different delivery methods. Any differences identified were not major and did not influence the outcome. This study supports the developmental path used to facilitate the Internet delivery of the module. By using a known and established module, as well as the same support material, a successful non-traditional version of the module was created.

The study does identify some issues that need to be addressed. The attrition rate of both delivery methods is a concern. Additional study should be considered to identify the reason why many students began the module but then left before completing the work. Another issue is the large number of students that completed the modules but received fail grades. This is especially important for two reasons. First, CIT 106B is an introductory module for new and beginning students. Second, CIT 106B is an elective for many other study programmes in the CIT department. Failure in this module could have a negative effect on new students at the college and on students completing programmes of study.

The high attrition and large number of fail grades could be attributed to students' self-assessed levels of knowledge of computers and technology indicated by the CLQ results. Two-thirds of the students who responded on the CLQ scored in the novice range. The CIT 106B module is totally about computer technology. Identifying ways to help students develop basic computing skills prior to taking the module might help lower the high attrition and reduce the number of fail grades.

The CIT 106B module, developed using the above methodology can be viewed at http://webcampus.ccsn.nevada.edu. Select the "Logon to MyWebCT" option. The sample ID is tstudent and the password is temp. All lectures will be available, but due to academic constraints, the module tests will not be available. The account above will be active during the EDMEDIA 2002 conference.

Conclusions

The use of Internet technology, along with various tools can make truly independent learning a reality. The offering of a module with time and place flexibility offers opportunities for students who otherwise would not be able to take advantage of higher education and provides as good a learning opportunity in this instance as the on-campus module. Because the module is delivered via the Internet, learning can take place at home, while travelling, or at an institutional computer lab. Such modules can also be offered by an institution to students not included in its normal audience - a global audience. This type of module is also attractive because it offers self-paced study to learners. Lectures can be repeated multiple times if a student is having difficulty grasping the subject - something that is not possible in a normal classroom environment. The advantages associated with this type of distance education module were sufficient motivation to continue the development of two similar modules. The first of the follow-on modules was made available in Spring 2001 and the second of the follow-on modules will be made available in Spring 2002.

Not all disciplines will be able to use this type of distance education module. However, the ability to offer such modules provides benefits both for the college (CCSN) and the students. These benefits far outweigh the negative aspects. This first module, along with the additional modules, will provide educational opportunities for students that would otherwise not be able to enjoy the fruits of higher education.

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